CLAIMS:

1. A capacitive plasma enhanced chemical vapor deposition reactor comprising:

a processing chamber;

a susceptor electrode within the chamber configured to support at least one semiconductor workpiece;

a shower head electrode within the chamber operably adjacent the susceptor electrode and configured to provide gaseous reactants into the chamber;

a single RF power generator operatively coupled with the susceptor electrode and the shower head electrode and configured to provide RF power thereto effective to develop a plasma processing environment within the chamber and a desired bias relative to the semiconductor workpiece; and

an RF power splitter operatively interposed the RF power generator and both the susceptor electrode and the shower head electrode, the RF power splitter configured to provide power from the RF power generator to both the susceptor and the shower head at a selected power ratio between the susceptor electrode and the shower head electrode.

2. The plasma enhanced chemical vapor deposition reactor of claim 1, wherein the susceptor electrode and the shower head electrode have respective surface areas which are different from one another, and the selected power ratio is proportional to a surface area ratio therebetween.

3. The plasma enhanced chemical vapor deposition reactor of claim 1, wherein the selected power ratio is other than a 1:1 ratio.

4. The plasma enhanced chemical vapor deposition reactor of claim 1, wherein the RF power splitter comprises a center tapped transformer having at least two output terminals, individual output terminals being connected to a respective one of the susceptor electrode and the shower head electrode.

5. The plasma enhanced chemical vapor deposition reactor of claim 1, wherein:

the RF power splitter comprises a center tapped transformer;

the susceptor electrode and the shower head electrode have respective surface areas which are different from one another; and

the selected power ratio is proportional to a surface area ratio therebetween.

6. The plasma enhanced chemical vapor deposition reactor of claim 1, wherein the susceptor electrode and the shower head electrode have respective surface areas which are substantially equivalent.

7. The plasma enhanced chemical vapor deposition reactor of claim 1, wherein the selected power ratio is adjustable.

8. The plasma enhanced chemical vapor deposition reactor of claim 1, wherein the RF power splitter comprises a transformer having a plurality of variably groundable windings for changing the selected power ratio.

9. The plasma enhanced chemical vapor deposition reactor of claim 1, wherein the susceptor electrode and the shower head electrode have respective surface areas which are substantially equivalent, and the selected power ratio is adjustable.

10. The plasma enhanced chemical vapor deposition reactor of claim 1, wherein the susceptor electrode and the shower head electrode have respective surface areas which are substantially equivalent, and the RF power splitter comprises a transformer having a plurality of variably groundable windings for adjusting the selected power ratio.

11. A plasma enhanced chemical vapor deposition reactor comprising:

a chamber defining a processing volume;

a first electrode operably associated with the chamber;

a second electrode operably associated with the chamber;

a single RF power generator; and

a transformer having an input side and an output side, the input side being connected to the RF power generator for receiving power generated thereby, and the output side having no more than two output terminals, one output terminal being connected to the first electrode, and the other output terminal being connected to the second electrode, the output side providing power to each of the first and second electrodes in accordance with a selected power ratio.

12. The plasma enhanced chemical vapor deposition reactor of claim 11, wherein at least one of the electrodes is disposed inside the chamber and is configured for supporting a semiconductor workpiece.

13. The plasma enhanced chemical vapor deposition reactor of claim 11, wherein one of the electrodes is disposed outside the chamber.

14. The plasma enhanced chemical vapor deposition reactor of claim 11, wherein both the first and second electrodes are disposed inside the chamber, the first electrode being configured for supporting a semiconductor workpiece.

15. The plasma enhanced chemical vapor deposition reactor of claim 11, wherein the first and second electrodes comprise respective surface areas which are different from one another.

16. The plasma enhanced chemical vapor deposition reactor of claim 11, wherein:

both the first and second electrodes are disposed inside the chamber, the first electrode being configured for supporting a semiconductor workpiece; and

the first and second electrodes comprise respective surface areas which are different from one another.

17. The plasma enhanced chemical vapor deposition reactor of claim 11, wherein the transformer output side comprises a plurality of variably groundable windings for varying the selected power ratio.

18. A parallel plate plasma enhanced chemical vapor deposition reactor comprising:

a processing chamber;

a susceptor electrode in the chamber and configured to support at least one semiconductor workpiece, the susceptor electrode comprising a first surface area;

a shower head electrode in the chamber and configured to provide reactants into the chamber, the shower head electrode comprising a second surface area which is less than the first surface area; and

a single RF power source operatively coupled to both the shower head electrode and the susceptor electrode and configured to provide RF power to each electrode according to a predefined relative magnitude effective to develop a desired bias relative to a semiconductor workpiece supported by the susceptor electrode and to develop a plasma processing environment within the processing chamber.

19. The parallel plate plasma enhanced chemical vapor deposition reactor of claim 18, wherein the predefined relative magnitude is directly proportional to the inverse ratio of the 4th power of the areas of the electrodes.

20. A parallel plate plasma enhanced chemical vapor deposition reactor comprising:

a processing chamber;

a susceptor electrode within the chamber configured to support at least one semiconductor workpiece, the susceptor electrode having a susceptor surface area;

a shower head electrode within the chamber operably adjacent the susceptor electrode and configured to provide gaseous reactants into the chamber, the shower head electrode having a shower head surface area which is smaller than the susceptor electrode surface area;

a single RF power generator operatively associated with the processing chamber and configured to provide RF power;

a center tapped transformer having an input side and no more than two output terminals, the input side being operably connected with and capable of receiving RF power from the RF power generator, and individual respective output terminals being connected with the susceptor electrode and the shower head electrode and configured to provide RF power to each electrode at a selected power ratio which is proportional to a ratio of the areas of the electrodes.

21. A plasma enhanced chemical vapor deposition reactor comprising:

a processing chamber;

a first electrode inside the chamber and configured for supporting a workpiece;

a second electrode operably associated with the chamber;

a single RF power generator configured to provide RF power;

a transformer having an input side and an output side with only two output terminals which form individual connections with any of the reactor's electrodes, the input side being operably connected with and receiving power from the RF power generator, the output terminals being configured to provide RF power to each electrode at a selected power ratio which is effective to both (a) develop a desired bias relative to a workpiece, and (b) establish and maintain a plasma processing environment inside the processing chamber; and

the output side further comprising a plurality of windings individual windings of which can be selectively grounded for varying the RF power provided to the respective electrodes and the selected power ratio thereof.

22. The plasma enhanced chemical vapor deposition reactor of claim 21, wherein the reactor is an inductive coil reactor and the second electrode is disposed outside the chamber.

23. The plasma enhanced chemical vapor deposition reactor of claim 21, wherein the reactor is a parallel plate reactor and the second electrode is disposed inside the chamber.

24. A semiconductor processing method of plasma enhanced chemical vapor depositing material over a semiconductor workpiece within a processing chamber comprising:

providing a first electrode for supporting a workpiece;

providing a second electrode operably associated with the chamber, the first and second electrodes constituting the only processing chamber electrodes relative to which a desired bias is to be developed and a plasma processing environment is to be created;

applying RF power to both the first and second electrodes from a single RF power generator, the applied power defining a selected power ratio between the first and second electrodes which is other than a 1:1 ratio; and

providing at least one reactive gas within the processing chamber effective to chemical vapor deposit a layer of material on a wafer supported by the first electrode within the processing chamber.

25. The semiconductor processing method of claim 24, wherein the second electrode is provided inside the chamber.

26. The semiconductor processing method of claim 24, wherein the second electrode is provided outside the chamber.

27. The semiconductor processing method of claim 24, wherein:

the second electrode is provided inside the chamber;

the first electrode comprises a susceptor electrode having a defined surface area;

the second electrode comprises a shower head electrode having a defined surface area, the shower head electrode being configured to provide reactants into the chamber; and

the respective surface areas of the first and second electrodes are different from one another.

28. The semiconductor processing method of claim 24, wherein the applying step comprises:

forming an operative connection between the first electrode, the second electrode, and an RF power splitter;

forming an operative connection between the RF power splitter and the single RF power generator;

splitting RF power supplied by the RF power generator into first and second power components;

applying the first power component to the first electrode; and

applying the second power component to the second electrode.

29. The semiconductor processing method of claim 24, wherein the applying step comprises:

forming an operative connection between the first electrode, the second electrode, and a transformer having an input side and an output side, the first and second electrodes being operatively coupled with the transformer output side;

forming an operative connection between the transformer input side and the single RF power generator;

splitting RF power supplied by the RF power generator into first and second power components;

applying the first power component to the first electrode; and

applying the second power component to the second electrode.

30. The semiconductor processing method of claim 24, wherein the applying step comprises:

forming an operative connection between the first electrode, the second electrode, and a transformer having an input side and an output side, the first and second electrodes being operatively coupled with the transformer output side;

forming an operative connection between the transformer input side and the single RF power generator;

splitting RF power supplied by the RF power generator into first and second power components;

applying the first power component to the first electrode;

applying the second power component to the second electrode; and

wherein the transformer output side comprises a plurality of variably groundable coils for enabling the respective magnitudes of the first and second power components to be varied.

31. A semiconductor processing method of plasma enhanced chemical vapor depositing material over a semiconductor workpiece within a processing chamber comprising:

providing a first electrode inside the chamber for supporting a workpiece;

providing a second electrode inside the chamber;

providing a transformer having an input side and an output side, the output side comprising a plurality of coils, one of the coils comprising a center coil;

forming an operative connection between the transformer input side and a single RF power generator, the generator being configured to provide RF power to the transformer input side and comprising the only RF power source which is operably associated with the processing chamber;

forming an operative connection between the transformer output side and the first and second electrodes, said connection comprising the only connection between the transformer and any processing chamber electrode;

grounding one of the transformer output side coils other than the center coil to produce first and second power components which are different in magnitude from one another, the first power component being applied to the first electrode and the second power component being applied to the second electrode; and

providing at least one reactive gas within the processing chamber effective to chemical vapor deposit a layer of material on a wafer supported by the first electrode within the processing chamber.

32. The semiconductor processing method of claim 31, wherein the first power component is greater than the second power component.

33. The semiconductor processing method of claim 31, wherein the transformer is capable of having others of the plurality of output side coils selectively grounded for varying the relative magnitudes of the first and second power components.

34. A semiconductor processing method of chemical vapor depositing material over a semiconductor workpiece within a processing chamber comprising:

splitting RF power produced by a single RF power source into first and second RF power components of different magnitudes, the single RF power source comprising the only RF power source which is associated with the processing chamber;

powering only two processing chamber electrodes with the respective different magnitude first and second RF power components; and

providing at least one reactive gas within the processing chamber effective to chemical vapor deposit a layer of material on a wafer supported by one of the electrodes within the processing chamber.

35. The semiconductor processing method of claim 34, wherein the powering comprises:

powering a first electrode with the first RF power component, the first electrode supporting at least one semiconductor workpiece for processing; and

powering a second electrode with the second RF power component, the second electrode being powered to a greater magnitude than the first electrode.

36. The semiconductor processing method of claim 34, wherein at least one of the processing chamber electrodes is disposed on the exterior of the processing chamber.

37. A semiconductor processing method of effecting plasma enhanced chemical vapor deposition comprising applying RF power to only two electrodes comprising part of a plasma enhanced chemical vapor deposition reactor from a single RF power generator during deposition, the single RF power generator comprising the only RF power generator which is associated with the reactor.

38. The semiconductor processing method of claim 37, wherein the electrodes are disposed interiorly of the reactor and have respective surface areas which are different from one another.

39. The semiconductor processing method of claim 37, wherein at least one of the electrodes is disposed interiorly of the reactor.

40. The semiconductor processing method of claim 37, wherein the reactor is an inductive coil reactor.

41. The semiconductor processing method of claim 37, wherein the RF power is applied to the electrodes according to a selected power ratio other than 1:1.